

# PATENT SPECIFICATION

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## COMPLETE SPECIFICATION.

### Inhaler.

I, JONASSEN, BERNHARDSON, of Wiesbaden, in the Free State of Prussia, Germany, of German nationality, do hereby declare the nature of this invention and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement:—

This invention relates to an inhaler with an air compressor which consists of two chambers through which the fresh air flows under pressure, one of cold chambers being constructed to form a heatable water receptacle for the production of hot moist air, the other chamber being constructed to form a cooling or refrigerating device for the production of cold dry air and means being provided for alternating inhalation of cold air and then of hot air.

In apparatus of this kind according to the present invention the refrigerator is composed of two parts, one of them in form of an annular receptacle and one of cylindrical shape, the latter one comprising a bell which dips into said annular receptacle. The cylindrical receptacle is situated in the open part of the annular receptacle and the walls of these two parts contain a very small annular space through which the air to be cooled is forced, whilst the dip bell contains a space above the two parts in which the compressed air is collected.

In this manner it is possible to ensure that the air to be inhaled is sufficiently cooled to a low temperature although it has only a short travel to make through the apparatus and is exposed to the cooling action only for a very short time. The invention further consists in providing means for producing the compressed air in a simple manner so that the apparatus can be used by any un-

The drawing illustrates the invention in two forms of construction. Fig. 1 shows in vertical section the apparatus with a dip bell as air compressor.

Fig. 2 shows in vertical section the apparatus with a water jet mover built in serving as air compressor. A receptacle 1 for water heated in a convenient manner and an inverted cylinder 2 mounted in the same axis of the steam chamber 3. An annular receptacle 4 and a second receptacle 5 with a projecting dip bell 6 dipping into said annular receptacle 4 form together the cooler which is separated from the heated receptacle by an insulating partition 4. Any other separated arrangement of the two chambers may be chosen.

The compressed air produced in a manner which will be described hereafter flows from the supply pipe 10 into the circulating tube 11 and from there on the one hand under the bell 6 and further into the space between the walls of the two cooling receptacles, the inner of these two receptacles being slightly guided in the entry by means of guide ribs 7, to the tubular socket 17 into the aspirating pipe for cold dried air and on the other hand into the steam chamber 3 and to the tubular socket 18 for hot moist air.

The cooling receptacles are filled with ice or with water of such a temperature which is required for the individual demand. A horizontal sleeve 9 at the lower edge of the dip bell can be used for this purpose in order to keep the ice fragments down when a specially cold temperature is required. A very dry air of moderate temperature can be further produced if the inner receptacle is filled with a cold conducting mixture the outer receptacle being filled with water. Any

production can be obtained as regards degree of cold or dryness. For the heating chamber the regulation by heating is sufficient.

Each aspirating pipe has a removable separator 15 for the reception of specimens of the value of condensation and further a thermometer. The aspirating pipes are connected by means of rubber tubes and when not in use they are closed in a holder 19 so that the rubber tube is squared. Instead of one aspirating socket several such sockets can be provided so that several patients can use one apparatus.

The description given relates to both forms of construction. For the production of air under pressure, which could be effected *per se* in any convenient manner, a dip bell 22 is provided according to Fig. 1 which is tightly guided in a receptacle 21 and which is adapted to take up in an upper space 23 water balanced in order to regulate the pressure sensitivity. To be filled the bell is lifted whereby the flap valve 24 is opened. The compressed air flows through a flexible tube 25 to the section and pressure needle 26 of the above mentioned supply tube 10 so that a multiple of the filling of the dip bell is worked into the apparatus so that the dip bell can be built as a producer of high pressure, a corresponding amount of space being saved. It is particularly of such dimensions that one filling determines also the time prescribed for the inhalation so that the aspirating tubes have to be changed each time when the bell is raised.

According to Fig. 2 the inner cooling receptacle is constructed so that it serves at the same time as a water jet injector from which the air jet is led through conduit 21 to a like section and pressure needle 26 as well according to Fig. 1, now however mounted with the supply pipe 10 in the dip bell 8 and forcing the air within the space confined by the dip bell and the water level in the annular receptacle 6 as well as in the chamber 3. In the top part of the dip bell 8 a water receptacle is arranged which serves as ballast to keep the receptacle 6 at the lowest position shown in Fig. 2.

The water from the water main flows through the nozzle 28 in a sharp jet through the central pipe 37, driving along the outer air through the openings 29 into the cylinder 6 and escaping 30 through the aspirating tube 10, from which it may be drawn off by a rubber tube not shown in the drawing. A pressurizing plate 29 prevents air bubbles from getting into the aspirating tube.

Having now particularly described and ascertained the nature of my said invention and in what manner the same is to be performed, I declare that what I claim is:—

1. Inhaler with air compressor consisting of two chambers through which the fresh air flows under pressure, one of cold chambers being constructed to form a heatable water receptacle for the production of hot moist air, the other chamber being constructed to form a refrigerating device characterized in that for the production of the cold dry air a refrigerator of cylindrical shape is provided into the annular space of a second receptacle built like an annular receptacle, the compressed air being delivered under said dip-bell.

2. Inhaler as claimed in Claim 1 characterized in that the lower edge of the dip bell of the inner cooling receptacle is provided with a horizontal perforated ring of sheet-metal or with a sleeve which keeps the few fragments down in the annular space.

3. Inhaler as claimed in Claim 1 characterized in that an adjustable loaded dip bell like a pressure needle or air compressor, said dip bell being raised in order to be filled working to fresh air through a flap valve, the compressed air being applied to the two chambers by a section and pressure needle inserted between said chambers and said air cooled between.

4. Inhaler as claimed in Claim 1 characterized in that a water jet injector serves for producing the compressed air.

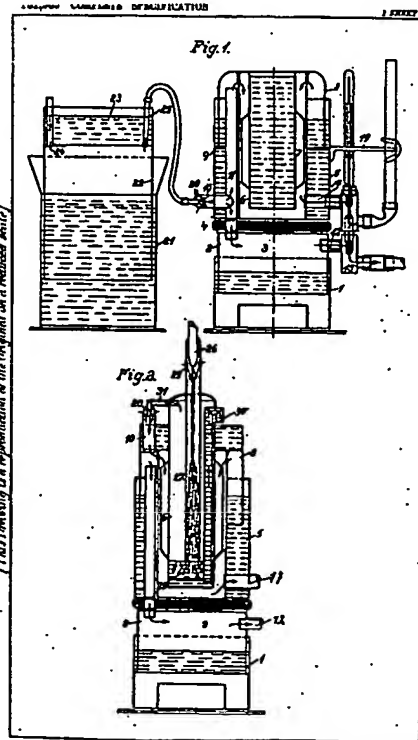
5. Inhaler as claimed in Claim 4 characterized in that the water jet injector is mounted in the dip bell 8.

6. Inhaler as claimed in Claim 4 and 5 characterized by a tube for the extra air jet extending vertically deeply into the collecting space for compressed air but terminating above a protecting plate and by an aspiration tube under the protecting plate for the outflow of the water.

Dated this 18th day of April, 1921.

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[This Drawing is a reproduction of the Original and is not a reduced scale.]